





TREATMENT PROTOCOL: CRUSH INJURY / CRUSH SYNDROME

1. Basic airway ①
2. Spinal immobilization prn/control bleeding prn
3. Pulse oximetry
4. Oxygen prn
5. Advanced airway prn
6. Cardiac monitor: document rhythm and attach ECG strip if dysrhythmia identified
7. Venous access
8. For pain management:
Morphine ②③⑥
2-12mg slow IV push, titrate to pain relief
Pediatric: 0.1mg/kg slow IV push
See Color Code Drug Doses/L.A. County Kids ⑦
9. **ESTABLISH BASE CONTACT (ALL)**
10. Fluid resuscitate, hydrate prior to release of compressive force to minimize hypovolemia and to dilute cellular toxins.
Normal Saline
20ml/kg IV bolus (adult and pediatric)
500ml/hr maintenance fluid:
 **Pediatric maintenance fluid:**
Weight up to 10kg: 4ml/kg/hr
Weight 10-20kg: 40ml/hr plus 2ml/kg/hr for each kg between 10 and 20kg④
Weight greater than 20kg: 60ml/hr plus 1 ml/kg/hr for each kg above 20 kg⑤
11. If pain unrelieved,
Fentanyl ②③⑥
50-100mcg slow IV push, titrate to pain relief
May repeat every 5min, maximum total adult dose 200mcg
 **Pediatric:** 1mcg/kg slow IV push (over 2 minutes)
See Color Code Drug Doses/L.A. County Kids ⑦
May repeat every 5min, maximum pediatric dose 50mcg
Morphine ②③⑥
2-12mg slow IV push, titrate to pain relief
May repeat every 5min, maximum total adult dose 20mg
 **Pediatric:** 0.1mg/kg slow IV push
See Color Code Drug Doses/L.A. County Kids ⑦
Maximum pediatric total dose 4mg
12. Release compression and extricate patient
13. If unable to release compression and **situation progresses to CRUSH SYNDROME** (entrapment lasting longer than 4hrs) or suspicion of hyperkalemia (peaked T-waves, absent P-waves and/or widened QRS complex):
Albuterol
5mg via continuous mask nebulization
 **Pediatric:** See Color Code Drug Doses/L.A. County Kids ⑦
Less than 1yr of age: 2.5mg
1yr of age or older: 5mg
Calcium Chloride
1gram slow IV push over 60 sec
Pediatrics: See Color Code Drug Doses/L.A. County Kids⑦
20mg/kg slow IV push over 60 sec
Maximum single dose 500mg
Flush IV tubing with normal saline prior to administering sodium bicarbonate

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to prevent precipitation

Sodium Bicarbonate

1mEq/kg added to 1L of normal saline, run IV wide open just prior to extrication



Pediatrics: See Color Code Drug Doses/L.A. County Kids ⑦

1mEq/kg added to 1L of normal saline, administer 20ml/kg IV

14. Release compression and extricate patient

SPECIAL CONSIDERATIONS

- ① Treatment may be compromised by confined space or MCI situation. Ideally, start treatment prior to release of compression. Evaluate for early HERT notification as per Ref. No. 817, Hospital Emergency Response Team. A HERT is utilized in a situation where a life-saving procedure, such as an amputation, is required due to the inability to extricate a patient.
 - ② Use with caution: in elderly; if SBP less than 100mmHg; sudden onset acute headache; suspected drug/alcohol intoxication; suspected active labor; nausea/vomiting; respiratory failure or worsening respiratory status
 - ③ Absolute contraindications: Altered LOC, respiratory rate less than 12 breaths/min, hypersensitivity or allergy
 - ④ For example, the maintenance rate for a 15kg child is as follows:
 $40\text{ml/hr} + (2\text{ml/kg/hr} \times 5\text{kg}) = 50\text{ml/hr}$
 - ⑤ For example, the maintenance rate for a 30kg child is as follows:
 $60\text{ml/hr} + (1\text{ml/kg/hr} \times 10\text{kg}) = 70\text{ml/hr}$
 - ⑥ Ondansetron 4mg IV, IM or ODT may be administered prior to fentanyl or morphine administration to reduce potential for nausea/vomiting
 - ⑦ If the child is off the Broselow™ and adult size, move to the Adult protocol and Adult dosing
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